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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/560,269	04/26/2000	Barry M. Nolte	777.344US1	2518

7590 01/04/2006

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EXAMINER	
RUTTEN, JAMES D	

ART UNIT	PAPER NUMBER
2192	

DATE MAILED: 01/04/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/560,269	NOLTE, BARRY M.	
	Examiner	Art Unit	
	J. Derek Rutten	2192	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 October 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,4-16,19-31 and 34-45* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,4-16,19-31 and 34-45* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/06/2005 has been entered. Claims 1, 4, 12, 13, 16, 27, 28, 31, and 34-45 have been amended. Claims 1, 4-16, 19-31, and 34-45 remain pending in the application and have been fully considered by the examiner.

Response to Arguments

2. Applicant's amendments have overcome the 35 U.S.C. § 101 rejections, and they are accordingly withdrawn.

3. Applicant has primarily argued (see paragraph 1 page 16 of the response) that the claims are not anticipated by the combination of Angel, Aho, and Srivastava because it does not disclose:

> eliminating one member of the probe location pair, wherein the eliminated member comprises one of: a call to function probe location in a calling function when the calling function calls to a called function, wherein the called function is within a current module of the calling function, and a return from function probe location in the calling function when the calling function calls to the called function, wherein the called function is within the current module of the calling function

However, further review of the Angel reference reveals a discussion of the elimination of a probe location by choosing not to instrument it. See column 13 lines 9-11, further discussed in the 35

USC § 103 rejection below. Also, Srivastava describes selecting probe locations in the context of a set of locations that include both before and after procedures. See column 10 lines 63-66. For these reasons, the argument is not persuasive.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1, 10-12, 16, 25-27, 31, and 40-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over prior art of record U.S. Patent Number 6,314,558 to Angel et al. (hereinafter "Angel") in view of prior art of record U.S. Patent Number 5,539,907 to Srivastava et al. (hereinafter "Srivastava").

In regard to claim 1, Angel discloses:

determining a set of probe locations in the application, (Column 3, lines 16-20), *wherein the set of probe locations comprises a probe location pair that produces redundant information; eliminating one member of the probe location pair...* Angel further discloses optimization of the placement of probes by way of eliminating locations that are within the "effective scope" of a parent block of code. See column 13 lines 9-15:

> One possible optimization is to not instrument scope changes that have minimal effect on monitoring variable operations. This optimization may be performed by first determining the scope of each portion of the IR code and then setting an effective scope of appropriate portions of the code to the effective scope of the immediately preceding block of code.

In other words, probe locations that have minimal effect on monitoring variable operations would provide redundant information, and can be eliminated from the set of locations to instrument.

a call to function probe location in a calling function when the calling function calls to a called function, wherein the called function is within a current module of the calling function See column 3 lines 22: "method call". This agrees with the definition of "module" appearing on page 1 lines 16-17 of the originally filed specification: "Computer software applications typically consist of many modules, known as functions, which work together to perform desired tasks." Note that using this definition, a called function must be within a current module (i.e. the "calling function"), otherwise the function could not be called.

inserting probes at the remaining probe locations in the application such that data collected relating to the execution of the application produces non-redundant information. See column 4 lines 3-7:

> ...selecting portions of the byte code representation for instrumentation using the program counter mapping table, instrumenting the portions by adding calls to instrumentation runtime functions at least some of the portions...

Angel does not expressly disclose a return from function probe location. However, in an analogous environment, Srivastava teaches that a return block has a single predecessor exit block See Figure 5 and column 8 lines 2-10:

> Each return block 152 has a single predecessor exit block 154. The exit block 154 is the last block executed before execution control is transferred to the calling procedure. An entry block may have many predecessor blocks, likewise for successors of the exit blocks 154. The normal blocks 155 are not involved in the interprocedural transfer of execution control, the normal blocks 155 define, use and consume variables and registers, for example variables x, y, and z. Following the "edges" of the program enables the tracing of the execution flow while the program is static.

This passage teaches that the control flow from a call to an entry is analogous to flow from exit to a return. Srivastava further teaches that a probe at the entrance of a function is sufficient to capture the behavior of function calls as opposed to having each calling routine duplicate the call. A call is placed at the entrance of a function to capture the behavior of the function. See column 10 line 63 – column 11 line 3:

> AddCallProc is similar at the procedure level. **The semantics of modifying the program before and after procedures and basic blocks are maintained even if there are multiple entry points and multiple exit points.** For example, if a procedure has multiple entry points, adding a call before the procedure will add the call for each entry point of the procedure, and will only call the analysis routine once, regardless of which entry point is selected during execution.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Srivastava's teaching of code instrumentation with Angel's probes. One of ordinary skill would have been motivated to call probe routines only once (Srivastava column 11 line 2).

In regard to Claim 10, Angel teaches using the instrumentation to collect information relating to the execution of the application (Column 32, lines 60-67).

In regard to Claim 11, it would have been obvious to analyze collected data in order to generate an application profile, optimize the code, or fix errors in the code.

In regard to claim 12, all further limitations have been addressed in the above rejection of claims 1, 10, and 11.

Claims 16 and 31 are medium and computer arrangement claims that correspond with method Claim 1, and Claims 16 and 31 are rejected for the same reasons as Claim 1, where Angel teaches a medium (Figure 2) and computer arrangement (Figure 1) to carry out the method of Claim 1.

Claims 25 and 40 are claims that directly correlate with claim 10 and are rejected for the same reasons as Claim 10.

Claims 26 and 41 are claims that directly correlate with claim 11 and are rejected for the same reasons as Claim 11.

Claims 27 and 42 are medium and computer arrangement claims that correspond with method Claim 12, and Claims 27 and 42 are rejected for the same reasons as Claim 12, where Angel teaches a medium (Figure 2) and computer arrangement (Figure 1) to carry out the method of Claim 12.

6. Claims 4, 6, 19, 21, 34, and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Angel, and Srivastava as applied in the above rejection of claim 1, and further in view of prior art of record U.S. Patent Number 6,332,213 to Grossman et al. (hereinafter "Grossman").

In regard to Claim 4, Angel does not teach identifying a first location within the application at which a function call directs execution of the application to a second

location outside of a current module, and inserting a first probe before the first location and a second after the first location. Grossman, however, does teach a method of selecting portions of code in which to place instrumentation (Column 19, lines 1-3), said portions corresponding to "operations that cause program variables to become defined or undefined" (Column 19, lines 24-25). These operations are defined in the specification to include "a function call or a return from a function call" (Column 11, lines 52-56). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to perform the method of Claim 1, further identifying a first location within the application at which a function call directs execution of the application to a second location outside of a current module, and inserting a first probe before the first location and a second after the first location, as taught by Grossman, since this allows information about what occurs and changes during a function call.

In regard to Claim 6, the above rejection of claim 1 is incorporated. Grossman teaches that it is desirable to place instrumentation code before and after function calls. Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to insert a probe in a first location, where said first location is before a function is called and also to insert a probe in a second location, where said second location is at the start of a function that the function call returns to after execution, in order to better instrument the program.

Claims 19 and 34 are medium and computer arrangement claims that correspond with method Claim 4, and Claims 19 and 34 are rejected for the same reasons as Claim 4, where Angel teaches a medium (Figure 2) and computer arrangement (Figure 1) to carry out the method of Claim 4.

Claims 21 and 36 are medium and computer arrangement claims that correspond with method Claim 6, and Claims 21 and 36 are rejected for the same reasons as Claim 6, where Angel teaches a medium (Figure 2) and computer arrangement (Figure 1) to carry out the method of Claim 6.

7. Claims 5, 7, 13, 14, 20, 22, 28, 29, 35, 37, 43 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Angel, Srivastava and Grossman as applied in the above rejection of claim 4, and further in view of prior art of record Whygodny (U.S. Patent Number 6,282,701), Miller (U.S. Patent Number 6,438,512) and O'Donnell (U.S. Patent Number 6,374,369).

In regard to Claim 5, Angel does not teach that the first probe is configured to collect an address of a first and second function in which the identified first and second location is located, a first stack pointer, and a first time indicator, and the second probe is configured to collect the address of the second function, a second stack pointer, and a second time indicator. Whygodny, however, does teach a method of monitoring and analyzing a computer program using tracing, where the trace data collected comprises "function calls (including the assembly address of the called function)" and "function

return values (including function address)" (Column 29, lines 6-9). Whygodny does not teach collecting a stack pointer or a time indicator. O'Donnell, however, does teach collecting starting and ending times before and after a function call (Column 1, lines 45-49). O'Donnell does not teach collecting a stack pointer. Miller, however, does teach monitoring a program's performance by periodically interrupting program flow, and calling a function that returns a stack (Column 3, lines 10-11). Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to perform the method of Claim 4, further configure two probes for monitoring program performance, both probes collecting the addresses of the calling and called function as taught by Whygodny, a stack pointer as taught by Miller, and a time indicator as taught by O'Donnell, since gathering as much data as possible aids in better program analysis.

In regard to Claim 7, Angel does not teach that the first probe is configured to collect an address of the calling function, an address of the called function, a first stack pointer, and a first time indicator, and the second probe is configured to collect the address of the called function, a second stack pointer, and a second time indicator. Whygodny, however, teaches a method of monitoring and analyzing a computer program using tracing, where the trace data collected comprises "function calls (including the assembly address of the called function)" and "function return values (including function address)" (Column 29, lines 6-9). Whygodny does not teach collecting a stack pointer or a time indicator. O'Donnell, however, does teach collecting starting and ending times before and after a function call (Column 1, lines 45-49). O'Donnell does not teach

collecting a stack pointer. Miller, however, does teach monitoring a program's performance by periodically interrupting program flow, and calling a function that returns a stack (Column 3, lines 10-11). Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to perform the method of Claim 6, and further configure two probes for monitoring program performance, both probes collecting the addresses of the calling and called function as taught by Whygodny, a stack pointer as taught by Miller, and a time indicator as taught by O'Donnell, since gathering as much data as possible aids in better program analysis.

In regard to claim 13, the above rejection of claim 12 is incorporated. All further limitations have been addressed in the above rejection of claims 4 and 5.

In regard to claim 14, the above rejection of claim 12 is incorporated. All further limitations have been addressed in the above rejection of claims 6 and 7.

Claims 20 and 35 are medium and computer arrangement claims that correspond with method Claim 5, and Claims 20 and 35 are rejected for the same reasons as Claim 5, where Angel teaches a medium (Figure 2) and computer arrangement (Figure 1) to carry out the method of Claim 5.

Claims 22 and 37 are medium and computer arrangement claims that correspond with method Claim 7, and Claims 22 and 37 are rejected for the same reasons as Claim 7,

where Angel teaches a medium (Figure 2) and computer arrangement (Figure 1) to carry out the method of Claim 7.

Claims 28 and 43 are medium and computer arrangement claims that correspond with method Claim 13, and Claims 28 and 43 are rejected for the same reasons as Claim 13, where Angel teaches a medium (Figure 2) and computer arrangement (Figure 1) to carry out the method of Claim 13.

Claims 29 and 44 are medium and computer arrangement claims that correspond with method Claim 14, and Claims 28 and 43 are rejected for the same reasons as Claim 14, where Angel teaches a medium (Figure 2) and computer arrangement (Figure 1) to carry out the method of Claim 14.

8. Claims 8, 23, and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Angel, and Srivastava, and further in view of prior art of record Yellin (U.S. Patent Number 5,761,513).

In regard to Claim 8, Angel further shows placing instrumentation code in the presence of a 'throw' operation (Figure 18 and Column 25, lines 20-34). Angel does not show placing instrumentation code at the beginning and end of a block of code, where the block of code is where the application is directed to in the occurrence of an error. However, Yellin teaches that "an exception handler 100 is a procedure" and is "executed

whenever the applicable exception gets thrown during execution" (Column 1, lines 15-20). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to place instrumentation code at the beginning and end of the exception handing function as taught by Angel, where the exception handling function is a block of code to which execution of an application is directed upon in the occurrence of an error, since this would allow for the collection of data during an exception.

Claims 23 and 38 are medium and computer arrangement claims that correspond with method Claim 8, and Claims 23 and 38 are rejected for the same reasons as Claim 8, where Angel teaches a medium (Figure 2) and computer arrangement (Figure 1) to carry out the method of Claim 8.

9. Claims 9, 15, 24, 30, 39, and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Angel, Srivastava and Yellin and further in view of Whygodny, Miller, and O'Donnell.

In regard to Claim 9, Angel does not teach that the first probe is configured to collect an address of the block of code, a first stack pointer, and a first time indicator, and the second probe is configured to collect the address of the block of code, a second stack pointer, and a second time indicator. Whygodny, however, does teach a method of monitoring and analyzing a computer program using tracing, where the trace data collected comprises "function calls (including the assembly address of the called

function)" and "function return values (including function address)" (Column 29, lines 6-9). Whygodny does not teach collecting a stack pointer or a time indicator. O'Donnell, however, does teach collecting starting and ending times before and after a function call (Column 1, lines 45-49). O'Donnell does not teach collecting a stack pointer. Miller, however, does teach monitoring a program's performance by periodically interrupting program flow, and calling a function that returns a stack (Column 3, lines 10-11). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to perform the method of Claim 8, and further configure two probes for monitoring program performance, both probes collecting the addresses of the calling and called function as taught by Whygodny, a stack pointer as taught by Miller, and a time indicator as taught by O'Donnell, since gathering as much data as possible aids in better program analysis.

In regard to claim 15, the above rejection of claim 12 is incorporated. All further limitations have been addressed in the above rejection of claims 8 and 9.

Claims 24 and 39 are medium and computer arrangement claims that correspond with method Claim 9, and Claims 24 and 39 are rejected for the same reasons as Claim 9, where Angel teaches a medium (Figure 2) and computer arrangement (Figure 1) to carry out the method of Claim 9.

Claims 30 and 45 are medium and computer arrangement claims that correspond with method Claim 15, and Claims 30 and 45 are rejected for the same reasons as Claim 15, where Angel teaches a medium (Figure 2) and computer arrangement (Figure 1) to carry out the method of Claim 15.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Patent 6,088,525 to Peri discloses elimination of instrumentation points (See column 5 lines 1-21.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to J. Derek Rutten whose telephone number is (571) 272-3703. The examiner can normally be reached on T-F 6:00 - 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tuan Q. Dam can be reached on (571) 272-3695. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

jdr

TUAN DAM
SUPERVISORY PATENT EXAMINER